



## Rocky Mountain Interagency Engine Academy 2013

### ROCKY MOUNTAIN ENGINE ACADEMY 2013

#### PRE-TEST #1

Name \_\_\_\_\_

Agency/Home Unit \_\_\_\_\_

Final Score: \_\_\_\_ / 133

Questions 1-20- Pick the correct answer (A,B,C, D) for the valve **names and functions** for the following numbers:

1. Valve #1: (2 pts)
  - A. OVERBOARD DISCHARGE - Flows water from the pump to the main discharge lines.
  - B. OVERBOARD SUCTION - Flows water from an external source to pump.
  - C. TANK TO PUMP - Flows water from the tank to the pump.
  - D. PUMP TO TANK - Flows water from the pump to the tank.
2. Valve #2: (2 pts)
  - A. OVERBOARD DISCHARGE - Flows water from the pump to the main discharge lines.
  - B. OVERBOARD SUCTION - Flows water from an external source to pump.
  - C. TANK TO PUMP - Flows water from the tank to the pump.
  - D. PUMP TO TANK - Flows water from the pump to the tank.
3. Valve #3: (2 pts)
  - A. OVERBOARD SUCTION - Flows water from an external source to pump.
  - B. OVERBOARD DISCHARGE - Flows water from the pump to the main discharge lines.
  - C. PRIMER - With the priming unit, allows the centrifugal pump to be primed.
  - D. GRAVITY TANK DRAIN - Drains water tank
4. Valve #4: (2 pts)
  - A. OVERBOARD DISCHARGE - Flows water from the pump to the main discharge lines.
  - B. PRIMER - With the priming unit, allows the centrifugal pump to be primed.
  - C. GRAVITY TANK DRAIN - Drains water tank
  - D. HOSE REEL - Flows water from the pump to the hose reel(s).
5. Valve #5: (2 pts)
  - A. IN-TANK SHUT-OFF - Shuts off water in the tank to the pump.
  - B. PRIMER - With the priming unit, allows the centrifugal pump to be primed.
  - C. AUXILIARY DISCHARGE - Flows water from the pump to an engine protection discharge.
  - D. BYPASS - Circulates water from the pump back to the tank for pump cooling.
6. Valve #6: (2 pts)
  - A. IN-TANK SHUT-OFF - Shuts off water in the tank to the pump.
  - B. PRIMER - With the priming unit, allows the centrifugal pump to be primed.
  - C. AUXILIARY DISCHARGE - Flows water from the pump to an engine protection discharge.
  - D. BYPASS - Circulates water from the pump back to the tank for pump cooling.



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7. Valve #7: (2 pts)
  - A. WATER DISCHARGE – 1.5” overboard discharge plumbed prior to the foam injection.
  - B. ADJUSTABLE PRESSURE RELIEF - Relieves excess pressure, preventing pump damage.
  - C. IN-TANK SHUT-OFF - Shuts off water in the tank to the pump.
  - D. PUMP BYPASS - Circulates water from the pump back to the tank for pump cooling.
8. Valve #8: (2 pts)
  - A. FEEDER VALVE – For clean water discharge and #2 valve.
  - B. PUMP & PLUMBING DRAIN - Drains water from the pump and plumbing..
  - C. IN-TANK SHUT-OFF - Shuts off water in the tank to the pump.
  - D. OVERBOARD SUCTION - Flows water from an external source to pump.
9. Valve #9: (2 pts)
  - A. 40 GALLON RESERVE - Flows reserve 40 gallons to the pump
  - B. GRAVITY TANK DRAIN - Drains water tank.
  - C. LOW VOLUME GRAVITY - Gravity discharge for backpack fill.
  - D. HOSE REEL - Flows water from the pump to the hose reel(s).
10. Valve #10: (2 pts)
  - A. PUMP BYPASS - Circulates water from the pump back to the tank for pump cooling
  - B. ENGINE COOLER - Circulates cool water from engine
  - C. FEEDER VALVE – For clean water discharge and #2 valve
  - D. IN-TANK SHUT-OFF - Shuts off water in the tank to the pump.
11. Valve #11: (2 pts)
  - A. PUMP BYPASS - Circulates water from the pump back to the tank for pump cooling
  - B. PUMP & PLUMBING DRAIN - Drains water from the pump and plumbing.
  - C. ENGINE COOLER - Circulates cool water from engine
  - D. PUMP COOLANT CLEAN-OUT - Flushes debris from plumbing
12. Valve #12: (2 pts)
  - A. PUMP BYPASS - Circulates water from the pump back to the tank for pump cooling
  - B. PUMP & PLUMBING DRAIN - Drains water from the pump and plumbing.
  - C. ENGINE COOLER - Circulates cool water from engine
  - D. PUMP COOLANT CLEAN-OUT - Flushes debris from plumbing
13. Valve #13: (2 pts)
  - A. GRAVITY TANK DRAIN - Drains water tank.
  - B. PUMP BYPASS - Circulates water from the pump back to the tank for pump cooling
  - C. ENGINE COOLER - Circulates cool water from engine.
  - D. OVERBOARD DISCHARGE - Flows water from the pump to the main discharge lines



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14. Valve #14: (2 pts)
- A. GRAVITY TANK DRAIN - Drains water tank.
  - B. FOAM BYPASS – Water routed around foam unit (Clean water discharge).
  - C. ENGINE COOLER - Circulates cool water from engine.
  - D. OVERBOARD DISCHARGE - Flows water from the pump to the main discharge lines
15. Valve #15: (2 pts)
- A. PUMP TRANSFER - Switches the pump to either parallel or series operation
  - B. PUMP BYPASS - Circulates water from the pump back to the tank for pump cooling
  - C. ENGINE COOLER - Circulates cool water from engine.
  - D. OVERBOARD DISCHARGE - Flows water from the pump to the main discharge lines
16. Valve #16: (2 pts)
- A. GRAVITY TANK DRAIN - Drains water tank.
  - B. PUMP BYPASS - Circulates water from the pump back to the tank for pump cooling
  - C. ENGINE COOLER - Circulates cool water from engine.
  - D. OVERBOARD DISCHARGE - Flows water from the pump to the main discharge lines
17. Valve #17: (2 pts)
- A. PUMP BYPASS - Circulates water from the pump back to the tank for pump cooling
  - B. ENGINE COOLER - Circulates cool water from engine.
  - C. PRIMER - With the priming unit, allows the centrifugal pump to be primed.
  - D. OVERBOARD DISCHARGE - Flows water from the pump to the main discharge lines
18. Valve #18: (2 pts)
- A. GRAVITY TANK DRAIN - Drains water tank.
  - B. IN-TANK SHUT-OFF - Shuts off water in the tank to the pump
  - C. ENGINE COOLER - Circulates cool water from engine.
  - D. LOW VOLUME GRAVITY - Gravity discharge for backpack fill.
19. Valve #19: (2 pts)
- A. GRAVITY TANK DRAIN - Drains water tank.
  - B. CLEAN WATER DISCHARGE – 1.5” overboard discharge plumbed prior to the foam injection.
  - C. ENGINE COOLER - Circulates cool water from engine.
  - D. PUMP & PLUMBING DRAIN - Drains water from the pump and plumbing.
20. Valve #20: (2 pts)
- A. FEEDER VALVE – For clean water discharge and #2 valve
  - B. PUMP BYPASS - Circulates water from the pump back to the tank for pump cooling
  - C. ENGINE COOLER - Circulates cool water from engine.
  - D. OVERBOARD DISCHARGE - Flows water from the pump to the main discharge lines
21. To pump water through a 1-1/2” line from a pond to a fire, valves #3 and #8 must be opened. (1pt)
- A. TRUE                      B. FALSE



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22. To keep a Model 52 engine with a full tank of water ready during freezing weather, which valve/valves should be closed? (1pt)
- A. #1, #2, #17
  - B. #4
  - C. #11
  - D. #3, #8
23. How many inches of vacuum are necessary to lift water six feet? (1pt)
- A. 10 inches
  - B. 8 inches
  - C. 12 inches
  - D. 6 inches
24. A Model 52 engine has a \_\_\_\_\_ per the 2003 Water Handling Guide: (1pt)
- A. Single Stage Positive Displacement Pump
  - B. 2 Stage Centrifugal Pump
  - C. 4 Stage Centrifugal Pump
  - D. 3 Stage Positive Displacement Pump
25. A positive displacement pump should have a pressure relief valve. (1pt)
- A. TRUE
  - B. FALSE
26. What do the following abbreviations mean? (6 pts)
- GVWR – \_\_\_\_\_
- NPSH – \_\_\_\_\_
- NH – \_\_\_\_\_
- GPM – \_\_\_\_\_
- PSI – \_\_\_\_\_
- CJRL – \_\_\_\_\_
27. When testing fire hose, the total length of each line tested shall not exceed: (1pt)
- A. 300 ft.
  - B. 150 ft.
  - C. 100 ft.
  - D. any length needed



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28. The pump on Model 71 Type III engine is rated at \_\_\_\_\_ gpm @ \_\_\_\_\_ psi. per the 2003 Water Handling Guide. (2 pt)
29. How many gallons of water are contained in a 100 ft. section of 1-1/2" hose? (1 pt)
- A. 12 gal.
  - B. 5 gal.
  - C. 7 gal.
  - D. 9 gal.
30. One PSI lifts water \_\_\_\_\_ feet. (1 pt)
31. Explain friction loss. (1 pt)
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32. The friction loss in 1-inch hose is approximately 6 times greater than 1-1/2" hose. (1 pt)
- A. TRUE
  - B. FALSE
33. Friction loss decreases as flow (GPM) increases. (1 pt)
- A. TRUE
  - B. FALSE
34. A "Floto-Pump" is a self-priming pump and can be started before it is set in water. (1 pt)
- A. TRUE
  - B. FALSE
35. When drafting from a stream, the suction screen should be deep enough to maintain a prime. (1 pt)
- A. TRUE
  - B. FALSE
36. Which of the following conditions can cause cavitation in a fire pump? (1 pt)
- A. Rising water temperature in your pump
  - B. A blocked or inadequate suction strainer
  - C. Using too small or too long a suction hose
  - D. All of the above
  - E. None of the above



37. After off road use with an engine, it is advisable to check for rocks between the duals and for possible tire sidewall damage. (1 pt)

- A. TRUE                      B. FALSE

38. A backup person is only required when you cannot see behind the engine. (1 pt)

- A. TRUE                      B. FALSE

39. Name the No. 1 priority in all fire services. (1 pt)

- A. Life/Safety
- B. Property Protection
- C. Resources Protection

40. Diesel engines are just naturally oily so leaks are to be expected. (1 pt)

- A. TRUE                      B. FALSE

41. Pick the best answer: what is a probable cause of a “howling, squealing” fan belt. (1 pt)

- A. Belt is loose
- B. Belt is dirty
- C. Belt is cracked
- D. None the above

42. What kind of contamination in the fuel system is the “typical” cause of diesel engine failure? (1 pt)

- A. Oil
- B. Water
- C. Other Fuel

43. What are four items to check during a pre-use inspection (pick the best answer): (2 pts)

- A. Tires, Lights/signals, engine oil level, coolant level in radiator,
- B. Windshield wipers, tires, map kit, equipment maintenance log, radio
- C. Brakes, driver license, first aid kit, windows



44. Which one of below is not part of Leader's Intent (according to the IRPG) (1 pt)
- A. End State
  - B. Task
  - C. Direction
  - D. Purpose
45. Which of the following is not part of Risk Management Process (according to the IRPG) (1 pt)
- A. Evaluate
  - B. Hazard Control
  - C. Decision Point
  - D. Hazard Assessment
  - E. Situation Awareness
  - F. Hazard Avoidance

**Hydraulic Calculations notes:**

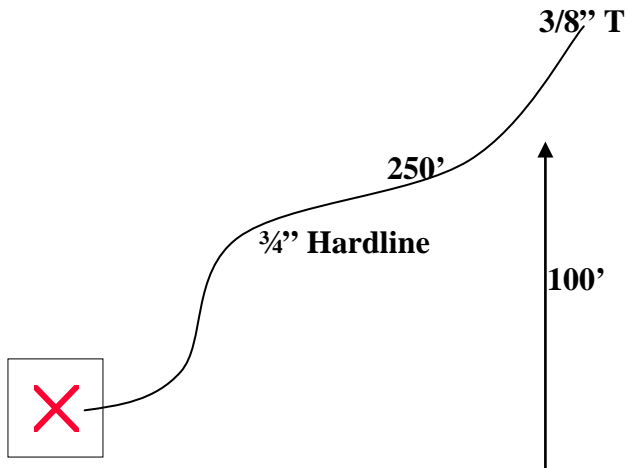
Your work must be legible and your answers must be +/- 5psi of the correct answer to receive credit.

There are major variations between different manufactures of friction loss calculators and differences between printings of the same calculators. If your answer is +/-5psi and you have checked your work to identify the variance it may be no more than the calculator you're using. Ask your instructor in class if you have concerns.

**Bring your workbook, friction loss calculator, regular calculator, and sample problems to the Academy.**



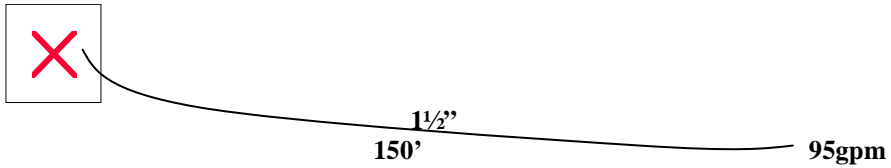
46.



**Solution #48 (4 pts.)**

NP =  
H =                      FL      GPM  
FL =  
PDP =

47.



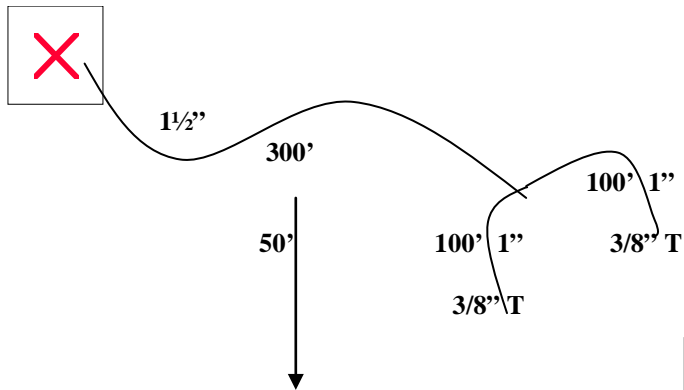
**Solution #49 (4 pts.)**

NP =  
H =                      FL      GPM  
FL =  
PDP =





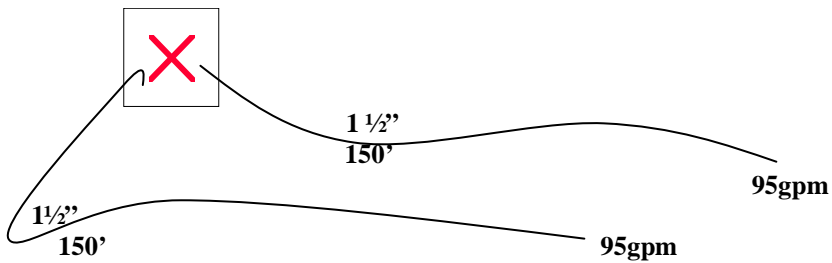
48.



**Solution #50 (5 pts.)**

NP=  
H= FL GPM  
FL 1" =  
FL 1 1/2" =  
PDP=

49.

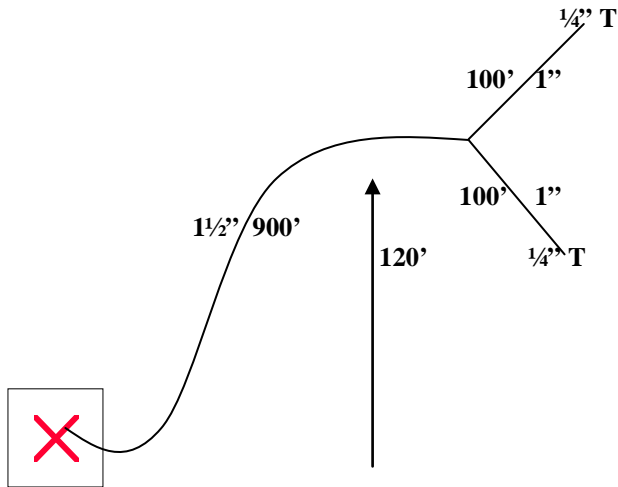


**Solution #51 (4 pts.)**

NP=  
H= FL GPM  
FL 1 1/2" =  
PDP=



50.



**Solution #52 (5 pts.)**

NP=

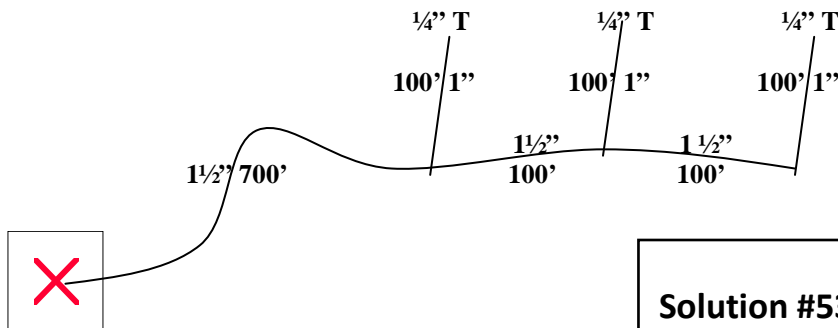
H= FL GPM

FL 1"=

FL 1 1/2"=

PDP=

51.



**Solution #53 (7 pts.)**

NP=

H= FL GPM

FL 1" =

FL 1 1/2" =

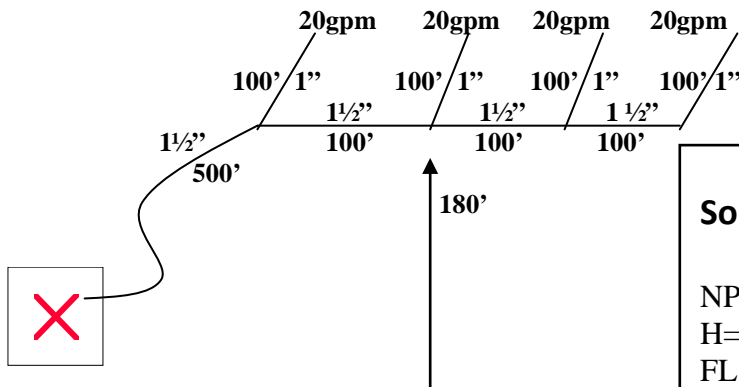
FL 1 1/2" =

FL 1 1/2" =

PDP=



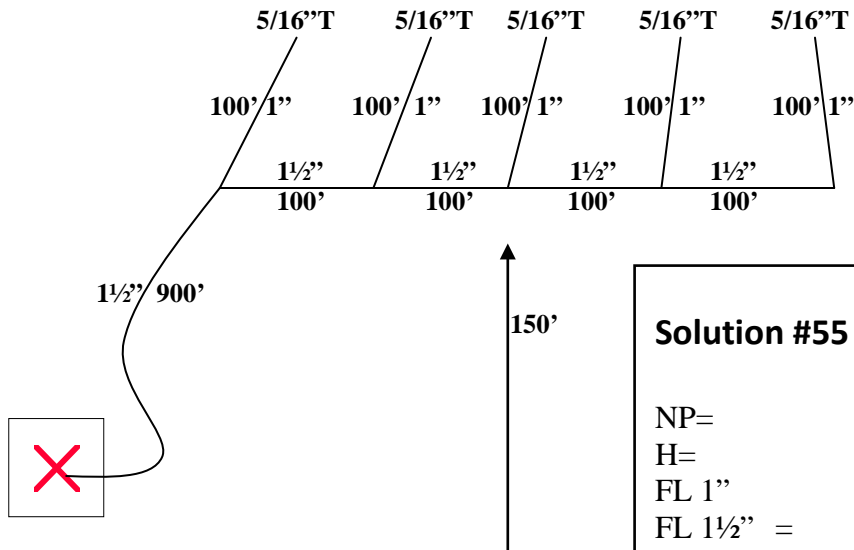
52.



**Solution #54 (8 pts.)**

NP=  
H= FL GPM  
FL 1" =  
FL 1 1/2" =  
FL 1 1/2" =  
FL 1 1/2" =  
FL 1 1/2" =  
PDP=

53.

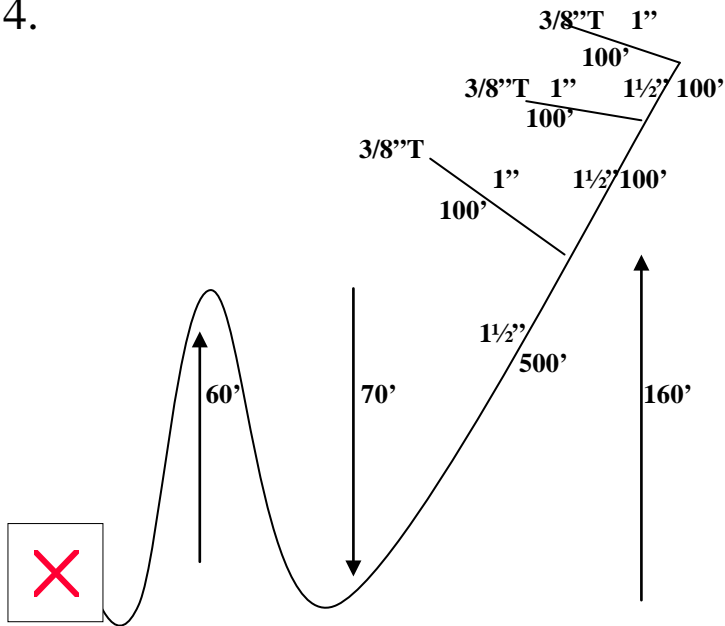


**Solution #55 (9 pts.)**

NP=  
H= FL GPM  
FL 1" =  
FL 1 1/2" =  
FL 1 1/2" =  
FL 1 1/2" =  
FL 1 1/2" =  
FL 1 1/2" =  
PDP=



54.



**Solution #56 (7 pts.)**

NP=

H=

FL      GPM

FL 1" =

FL 1 1/2" =

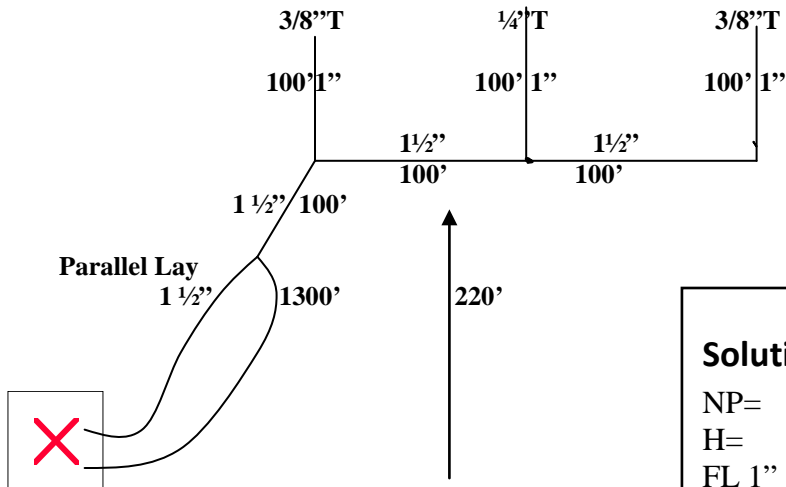
FL 1 1/2" =

FL 1 1/2" =

PDP=



55.



**Solution #55a @ $\frac{3}{8}$ " tip (4 pts.)**

NP=

H= FL GPM

FL  $1$ " =

FL  $1\frac{1}{2}$ " =

FL  $1\frac{1}{2}$ " =

FL  $1\frac{1}{2}$ " =

FL  $1\frac{1}{2}$ " =

PDP=

**Solution #55b @ $\frac{1}{4}$ " tip (4 pts.)**

NP=

H= FL GPM

FL  $1$ " =

FL  $1\frac{1}{2}$ " =

FL  $1\frac{1}{2}$ " =

FL  $1\frac{1}{2}$ " =

PDP=